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CITY OF MIDDLETOWN
DEPARTMENT OF PUBLIC WORKS
WASTEWATER TREATMENT PLANT

Evaluation of the Adequacy of
Existing Local Limits

Response to OEPA Review Comments

City of Middletown WWTP
300 Oxford State Road
Middletown, Ohio 45042

September 7, 2000

CITY OF MIDDLETOWN

LOCAL LIMIT DETERMINATION AND RESPONSE TO OHIO EPA COMMENTS ON JANUARY 1998 BBS CORPORATION REPORT "EVALUATION OF THE ADEQUACEY OF EXISTING LOCAL LIMITS"

INTRODUCTION

This submittal has been prepared in response to comments received from Ohio EPA concerning the City of Middletown Local Limit Evaluation prepared by BBS Corporation (BBS), dated January 1998. This project has been prepared by an Ohio Registered Professional Engineer, the certification statement is provided at the end of the report text.

The Ohio EPA review of BBS's report was completed by Mr. Bill Landshof. The letter containing Mr. Landshof's comments dated August 13, 1999 is included as Appendix A. A copy of the BBS report, "Evaluation of the Adequacy of Existing Local Limits" is included as Appendix B.

ASSUMPTIONS USED AND CHANGES MADE TO THE DATA AND INFORMATION USED BY BBS CORPORATION

BBS Corporation (BBS) conducted an evaluation of the local limits for the City of Middletown. The report is dated January 1998 and is included in the appendices. The City has prepared the following responses to Ohio EPA's comments on the BBs report. A copy of OEPA's comments is also provided in the appendices. Assumptions and changes were necessary to adequately respond to OEPA's comments and to reflect current conditions at the POTW.

(1) Several of the Significant Industrial Users listed in Table 12 of the BBS Report have either ceased operations or changed ownership. In addition, two new SIUs have been added since the report was submitted. These changes are as follows:

- Sorg Paper Co. – Ceased Operations
- Smurfit Graphic Arts – Ceased Operations
- Cincinnati Environmental Technologies – Ceased operations. Facility is now owned and operated by United Oil Recovery Services, Inc. and began discharging to the POTW in January 2000.
- Jefferson-Smurfit – Purchased by Stone Container and now operates as Smurfit-Stone
- Crystal Tissue – Added as a SIU, December 1999
- 4 Aces Sanitation – Added as a SIU, July 1998

The current list of SIUs and the average daily flow of each are listed in Table 1. As indicated in Table 1, the total average industrial flow is 7.6 MGD and the total domestic flow is 13.8 MGD.

As a result of the recent rehabilitation of an aging interceptor sewer to reduce inflow/infiltration, the domestic flow has been reduced since the BBS report was submitted. In addition, the original industrial flow of 4.2 MGD used by BBS appears to be erroneously low. The current average industrial flow of 7.6 MGD includes Bay West Paper, which normally is a direct discharger.

Despite all the changes affecting industrial and domestic flows mentioned above, the total current POTW flow is not significantly different from the 21.4 MGD used by BBS. Accordingly, all calculations in the BBS report involving the total POTW flow remain valid with the exception of the calculation for the primary removal rate for lead which was reduced from 98.8% to 57% as recommended by Ohio EPA and based on the guidance provided in the USEPA document "Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program".

(2) Regarding Ohio EPA's comment No. 5 which recommended using the "book values" for the primary removal rates of lead and total chromium (57% and 27%, respectively) rather than the values determined by limited sampling by the City (98.8% for lead and 76.7% for chromium), the following rationale has been used in considering Ohio EPA's recommendation:

- The City agrees that the 98.8% primary removal rate for lead is incorrect, particularly when the raw-to-final removal rate was determined to be 84.4%. On this basis, the "book value" of 57% appears reasonable and has been used in the revised calculations.

- Regarding the primary removal rate for chromium, the City believes that the 76.7% removal rate is reasonable and that the "book value" of 27% is unreasonably low for Middletown's situation. This position is based on the following points:

  - The raw-to-final removal rate was 86.8% for total chromium and 58.3% for the soluble, hexavalent form.

  - Only one SIU, PreFinish Metals, utilizes chromate in its processes and utilizes a chrome reduction step in the pretreatment operation. Chromium discharged by PreFinish Metals is in the reduced, insoluble, trivalent form and a significant portion would be expected to be removed in the POTW primary clarifiers. The only remaining chrome plater in the city, IVA-Middletown, is zero discharge from its chrome-plating department.

  - During 1997, the twelve monthly influent samples (Appendix A in the BBS Report) showed chromium concentrations ranging from 10 ug/l to 370 ug/l, with an average of 62 ug/l. During the same twelve months, all effluent samples were below the MDL of 4 ug/l (Appendix B in the BBS Report). Using one-half the MDL for the effluent concentration, the raw-to-final removal rate is 96.8%. It does not seem unreasonable that over 70% of this removal would occur in the primary system.

While use of a primary removal rate of 76.7% for chromium results in a very generous maximum headwork's loading of 162 lbs./day, the City has chosen to allocate less than the 61 lbs./day maximum headwork's loading derived by using the 27% "book value" primary removal rate. This issue will be carefully re-evaluated when another local limit review will be required in conjunction with renewal of the NPDES Permit.

(3) The Individual Loading Allocation Method has been selected for deriving revised local limits for Middletown.

DETAILED RESPONSES TO OHIO EPA'S COMMENTS

COMMENT NUMBER 1

Sludge quality based allowable headwork's loadings have been calculated using the monthly average concentration limits (Table 3, 503.13). Cumulative loading rates do not apply so long as the sludge meets these limits.

The formula used in the calculations was developed to utilize the available 1999 calendar year data:

L_{IN} = ((5350 dry tons/362 operating days)(2000 lbs./ton)(mg/kg)(1/10^6)) / R_{POTW}

Where:

L_{IN} = Allowable influent loading, lbs./day
mg/kg = Concentration limit for each pollutant from Table 3, 503.13
R_{POTW} = Removal efficiency across POTW, as a decimal

The results are listed in Table 2.

Table 3 is a summary of allowable headwork's loadings based on the evaluated criteria (Note that Table 3 is a revision of Table 8 from the BBS Report). The last column of Table 3 presents the most stringent allowable headwork's loadings from all the evaluated criteria.

COMMENT NUMBER 2

The allowable industrial loadings are calculated by subtracting the domestic loadings from 85% of the maximum allowable headwork's loadings in the last column of Table 3, i.e., a 15% safety factor was used. Table 4 lists the domestic loadings using the current domestic flow of 13.8 MGD (note that Table 4 is a revision of Table 11 from the BBS Report).

Table 5 lists the maximum allowable headwork's loadings, less 15%; the domestic loadings and the resulting difference, which are the allowable industrial loadings.

Table 6 lists the local limit concentrations assigned to each industry resulting in the lbs./day allocations listed in Table 7. Categorical limits and the resulting mass load (lbs./day) allocations are highlighted in the tables. The procedure employed in assigning the listed local limits to the SIUs consisted of reviewing the pollutant concentrations measured in each industry's waste stream during the past four years or in the case of recent SIUs, all available data, and the selection of limits that allow each industry to readily comply while being stringent enough to be violated by major excursions. In general, the high volume users who do not use or discharge the regulated pollutants were given much lower limits than the low volume users, many of which utilize and discharge the pollutants. Despite assigning generous limits to each SIU it should be

noted that it was not necessary to allocate all of the allowable industrial loading for each pollutant.

With the allowable headwork's loading for mercury established at 0.015 lbs./day, it is not feasible to allocate pollutant levels to individual industries. As an alternative means of regulating the SIUs, the City is proposing to utilize a narrative discharge limitation. The proposed language for the narrative limit is as follows:

NARRATIVE WASTEWATER DISCHARGE LIMITATIONS
FOR MERCURY

The City may require users to eliminate or reduce the discharge of mercury to the City of Middletown Wastewater Treatment Facility.

The City may require users:

1. *To conduct an investigation to identify and quantify sources of mercury in their discharge.*
2. *To eliminate the discharge of mercury if feasible. However, provided that a user demonstrates to the City's satisfaction that it is not feasible for the user to completely eliminate mercury in its discharge, the City may then allow the user to develop and implement a City-approved set of measures that will utilize all known, available, and reasonable means of prevention, control, and treatment to reduce the discharge of mercury to the maximum extent practicable. Required measures may include (but are not limited to) pretreatment, pollution prevention, recycling, substitution, waste minimization, source reduction, source elimination, spill prevention, and implementation of best management practices.*
3. *To submit documentation or monitoring results to verify that their discharge of mercury has been eliminated or reduced as required by the City.*

COMMENT NUMBER 3

A safety factor of 15% was used for the maximum allowable headwork's loadings, see Table 5.

COMMENT NUMBER 4

Listed below are all conservative pollutants found in the current indirect discharge permits:

Cadmium – Local limit applies to all SIUs except four of which are categorical
Chromium – Local limit applies to all SIUs except three of which are categorical
Copper – Local limit applies to all SIUs except four of which are categorical
Mercury – Local limit applies to all SIUs (local limit only)
Nickel – Local limit applies to all SIUs except three of which are categorical
Zinc – Local limit applies to all SIUs except three of which are categorical
Lead – Four categorical users only (not a local limit)

Silver – Two categorical users only (not a local limit)
Selenium – One categorical user only (not a local limit)

COMMENT NUMBER 5

As previously discussed the recommended 57% primary removal rate for lead was utilized but not the recommended 27% removal rate for chromium.

PROFESSIONAL ENGINEER CERTIFICATION STATEMENT

Pursuant to guidance received from Ohio EPA, this project has been completed by an Ohio Registered Professional Engineer.

Paul Fraley, Jr., P.E.
Registration No. E-42613

Paul Fraley Jr.

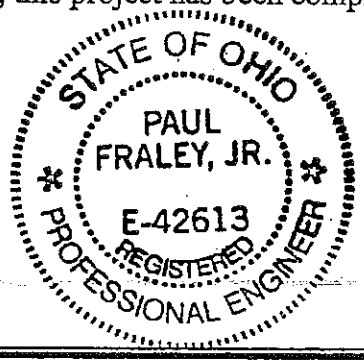

TABLE 1. Significant Industrial Users

Categorical Industries	Average Daily Flow (MGD)
Bay West Paper (40 CFR Part 430)	3.707
Crystal Tissue (40 CFR Part 430)	1.874
Smurfit-Stone (40 CFR Part 430)	1.223
AK Steel (40 CFR Part 420)	0.499
Middletown Paperboard (40 CFR Part 430)	0.224
Prefinish Metals (40 CFR Part 465)	0.086
Pilot Chemical (40 CFR Part 417)	0.003
Electrometallics (40 CFR Part 413)	0.010
Square D (40 CFR Part 433)	0.006
Gibson Plating (40 CFR Part 413)	0.0024
Shepard Chemical (40 CFR Part 415)	0.0017
Propipe Technologies (40 CFR Part 433)	0.0005
Non-Categorical Industries	**Average Daily Flow (MGD)**
United Oil Services	0.0046
4 Aces Sanitation	0.0026
IVA Middletown	0.0013
SOS Leveling	0.0011

Total Industrial Flow = 7.6 MGD

Total Domestic Flow = 13.8 MGD

Total Avg. POTW Flow = 21.4 MGD

TABLE 2. Sludge Quality-Based Allowable Headworks Loadings

Pollutant	Sludge Disposal Criterion, mg/kg*	R_{POTW}**	Maximum Allowable Headworks Loading, lbs./day
Copper (Cu)	1500	0.742	60
Lead (Pb)	300	0.844	10.5
Zinc (Zn)	2800	0.662	125
Cadmium (Cd)	39	0.417	2.8
Selenium (Se)	100	0.583	5.1
Mercury (Hg)	17	0.817	0.62
Nickel (Ni)	420	0.648	19.2
Arsenic (As)	41	***	---

*Monthly Average Concentration Limits From Table 3, 503.13
**From Appendix C, BBS Report
***Not Measured

TABLE 3. Summary of Allowable Headworks Loading (lbs./day) Based on Evaluation Criteria

Parameter	NPDES Permit	Nitrification Inhibition	Activated Sludge Inhibition	Water Quality Criteria	Sludge Quality Criteria	Maximum Allowable Headworks Loading, (lbs./day)
Cadmium, TR	2.1	1092	210	See note 3	2.8	2.1
Chromium, TR	See note 1	191	766	350	See note 6	191
Copper, TR	44	41	819	See note 3	60	41
Mercury, Total	0.03	See note 4	20	See note 3	0.62	0.03
Nickel, TR	See note 1	52	208	293	19.2	19.2
Zinc, TR	See note 1	52	195	229	125	52
Selenium, TR	7.9	See note 2 and 4	See note 2 and 4	See note 3	5.1	5.1[2]
Lead, TR	See note 1	205[5]	42[5]	57	10.5	10.5
Silver, TR	See note 1 and 2	See note 2 and 4	See note 2 and 4	4.1[2]	See note 6	4.1[2]
Free Cyanide	8.3	See note 2 and 4	See note 2 and 4	See note 3	See note 6	8.3[2]
Hex. Chromium	See note 1 and 2	See note 2 and 4	See note 2 and 4	7.7[2]	See note 6	See note 2

NOTES:

1 - No numerical limit given in NPDES Permit
2 - Not considered a pollutant of concern
3 - Water Quality Criteria not given in NPDES Permit
4 - Inhibition threshold not found in literature
5 - Primary removal rate of 57% utilized in calculations
6 - Not listed in Table 3, 503.13

TABLE 4. Domestic Sewage Analyses and Loadings

Parameter	Concentration (ug/l)	Loadings (lbs./day)
Cadmium (Cd)	0.1	0.01
Chromium (Cr)	3	0.3
Copper (Cu)	103	11.8
Mercury (Hg)	0.1[2]	0.01
Nickel (Ni)	9	1
Zinc (Zn)	68	7.8
Selenium (Se)	2.5[2]	0.29[3]
Lead (Pb)	6	0.7
Silver (Ag)	0.5[2]	0.06[3]
Free Cyanide (F CN)	5[2]	0.6[3]

Loadings were calculated using the current average domestic flow of 13.8 MGD

FOOTNOTES:

1 - Based on limited sampling conducted December 1997 through January 1998

2 - Value reported is 1/2 MDL since all data reported were lessthan MDL

3 - Not considered pollutants of concern

TABLE 5. Maximum Allowable Industrial Loadings

Pollutant	Maximum Allowable Headworks Loading Less 15%, (lbs./day)	Domestic Loading (lbs./day)	Maximum Allowable Industrial Loading (lbs./day)
Cadmium (Cd)	1.8	0.01	1.8
Chromium (Cr)	162	0.3	162
Copper (Cu)	35	11.8	23
Mercury (Hg)	0.025	0.01	0.015
Nickel (Ni)	16.3	1.0	15
Zinc (Zn)	44	7.8	36
Selenium (Se)	4.3	0.29	4
Lead (Pb)	9	0.7	8
Silver (Ag)	3.5	0.06	3.4
Free Cyanide (CN)	7.1	0.6	6.5

TABLE 6. Summary of Industrial Flow and Proposed Local Limit Concentrations

INDUSTRY	Flow (MGD)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Hg (mg/L)	Ni (mg/L)	Zn (mg/L)	Se (mg/L)	Pb (mg/L)
Bay west	3.707	0.01	0.5	0.30	narrative	0.1	0.3	NA	NA
Crystal	1.874	0.01	0.5	0.30	narrative	0.1	0.3	NA	NA
Smurfit	1.223	0.01	0.5	0.30	narrative	0.1	0.3	NA	NA
AK Steel	0.499	0.01	0.5	0.30	narrative	0.1	0.3	NA	NA
MPB	0.224	0.01	0.5	0.30	narrative	0.1	1.5	NA	NA
PFM	0.086	0.01	0.3	0.54	narrative	2	0.98	NA	NA
Pilot	0.003	0.02	10	4.00	narrative	2	10	NA	NA
Electro	0.01	1.2	10	4.00	narrative	2	10	NA	0.6
Sq D	0.006	0.69	2.77	3.38	narrative	3.98	2.61	NA	0.69
United oil	0.0046	0.05	10	4.00	narrative	2	15	NA	NA
Gibson	0.0024	1.2	10	4.00	narrative	15	10	NA	0.6
4 Aces	0.0026	0.05	10	4.00	narrative	2	10	NA	NA
Shepherd	0.0017	0.01	10	1.10	narrative	1.1	10	1.6	NA
IVA	0.0013	0.01	10	4.00	narrative	2	10	NA	NA
SOS	0.0011	0.05	10	4.00	narrative	2	10	NA	NA
Propipe	0.0005	0.69	2.77	3.38	narrative	3.98	2.61	NA	0.69

Note: Data highlighted in yellow indicates categorical limit which are not subject to allocation
NA denotes "Not Applicable" - no local limit has been established for these parameters

TABLE 7. SIU Pollutant Allocation and Allowable Industrial Pollutant Loadings

INDUSTRY	Cd	Cr	Cu	Hg	Ni	Zn	Se	Pb
Bay west	0.309	15.458	9.275	Narrative	3.092	9.275	NA	NA
Crystal	0.156	7.815	4.689	Narrative	1.563	4.689	NA	NA
Smurfit	0.102	5.100	3.060	Narrative	1.020	3.060	NA	NA
AK Steel	0.042	2.081	1.248	Narrative	0.416	1.248	NA	NA
MPB	0.019	0.934	0.560	Narrative	0.187	2.802	NA	NA
PFM	0.007	0.215	0.387	Narrative	1.434	0.703	NA	NA
Pilot	0.001	0.250	0.100	Narrative	0.050	0.250	NA	NA
Electro	0.100	0.834	0.334	Narrative	0.167	0.834	NA	0.050
Sq D	0.035	0.139	0.169	Narrative	0.199	0.131	NA	0.035
United oil	0.002	0.384	0.153	Narrative	0.077	0.575	NA	NA
Gibson	0.024	0.200	0.080	Narrative	0.300	0.200	NA	0.012
4 Aces	0.001	0.217	0.087	Narrative	0.043	0.217	NA	NA
Shepherd	0.000	0.142	0.016	Narrative	0.016	0.142	0.023	NA
IVA	0.000	0.108	0.043	Narrative	0.022	0.108	NA	NA
SOS	0.000	0.092	0.037	Narrative	0.018	0.092	NA	NA
Propipe	0.003	0.012	0.014	Narrative	0.017	0.011	NA	0.003
Pounds Allocated	***0.801***	***33.980***	***20.253***	***Narrative***	***8.621***	***24.337***	***0.023***	***0.099***
	1.8	**162**	**25**	**0.0170**	**15**	**38**	**4.1**	**8**
	Allowable Industrial Headworks Loading, lbs./day							

Note: Data highlighted in yellow indicates categorical limit which are not subject to allocation.
NA denotes "Not Applicable" - no local limit has been established for these parameters

APPENDIX A

OEPA Document Review Comments

August 1999

OhioEPA
State of Ohio Environmental Protection Agency

STREET ADDRESS:
zarus Government Center
2 South Front St.
Columbus, OH 43215

TELE: (614) 644-3020 FAX: (614) 644-2329

MAILING ADDRESS:
Lazarus Government Center
P. O. Box 1049
Columbus, OH 43216-1049

August 13, 1999

Thomas Gault
Superintendent of Treatment Plants
City of Middletown
One City Centre Plaza
Middletown, Ohio 45042

Re: City of Middletown
Local Limit Modification

Dear Mr. Gault:

I have completed the initial review of the City of Middletown's proposed local industrial user limits. I have attached a list of the following items that need to be addressed before the proposal can be public noticed and approved.

1. The allowable headworks loadings (based on the land application criteria) were not calculated. Please resubmit the loading calculations. If the newly calculated headworks loadings are more stringent than the current controlling criterion, please revise the City's proposal.

2. Assuming that all industries discharge at their average flows and permitted concentrations, the proposed local limits will result in loadings that exceed the allowable loadings. (See the attached chart). The City shall not permit loadings in excess of its allowable headworks loadings. Please revise the City's allocation method and resubmit the results.

3. A safety factor was not used in the calculations. Usually a 10 to 30 percent safety factor is used. Please resubmit the calculations using the appropriate safety factor.

4. Please submit a list of all conservative pollutants that appear in the City's indirect discharge permits.

5. Primary removal rates for lead and chromium were calculated using only one or two data points. I would recommend that the City follow US EPA's *Guidance Manual on the Development and Implementation of Local Discharge Limitations*

Attachment

Pollutant	Proposed local limit (mg/l)	Proposed Industrial Loading (lb)	Domestic loading (lb)	Proposed Industrial loading + Domestic loading (lb)	Allowable loading (lb)
Cadmium	3	105	.01	105.01	2.1
Chromium	7.5	262.5	0.43	264.93	191
Copper	5	175	15	190	41
Lead	NA	NA	.86	NA	57
Mercury	.2	7	.01	7.01	.03
Nickel	15	525	1.3	526.3	52
Zinc	10	350	9.8	359.8	52
Cyanide	5	175	0?	175	8.3

This electronic version of the City of Middletown, Ohio Codified Ordinances is not the official version. The only officially published version is available through the office of the Clerk of Council, located on the third floor of the City Building, telephone (513) 425-7831. This electronic version contains legislation as of October 1, 2008. This electronic version may, occasionally, differ from the official version and should be relied upon for general informational purposes only.